QRPAY PARKING SYSTEM

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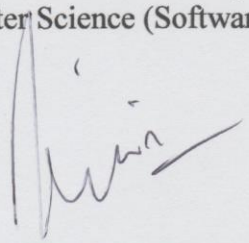
Bachelor of Computer Science (Software Engineering) with Honours

UNIVERSITI MALAYSIA PAHANG

Universiti Malaysia PAHANG
Engineering • Technology • Creativity

SUPERVISOR'S DECLARATION

I hereby declare that I have checked this project and in my opinion, this project is adequate in terms of scope and quality for the award of the degree of Bachelor of Computer Science (Software Engineering) with Honours.



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STUDENT'S DECLARATION

I hereby declare that the work in this project is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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ABSTRAK

Kaedah pembayaran tempat letak kereta awam sentiasa menjadi isu hangat selama bertahun-tahun. Banyak masalah berlaku termasuk kerosakan mesin, kekurangan ejen kupon telah menyusahkan ramai orang yang menggunakan ruang letak kereta. Ramai pakar telah mencipta beberapa aplikasi untuk mengatasi isu yang sama di kawasan yang berbeza. Walau bagaimanapun, masih terdapat beberapa kekurangan yang berlaku dalam aplikasi sedia ada. Sistem QrPay dicadangkan untuk menangani masalah pembayaran letak kereta yang berlaku di Kuantan, Pahang dengan cara yang lebih baik. Idea utama Sistem QrPay ialah pengguna boleh menetapkan tempat letak kereta dengan peranti mudah alih mereka dengan mengimbas kod QR yang dilampirkan di tempat letak kereta. Pengguna boleh membuat pembayaran letak kereta mereka melalui aplikasi mudah alih di mana sistem secara automatik akan mengira jumlah untuk mereka berdasarkan masa yang mereka habiskan pada sesi letak kereta. Sistem ini akan dihasilkan dengan menggunakan pendekatan Mobile-D yang merupakan salah satu metodologi Agile umum. Pembangunan sistem akan melalui lima fasa berbeza yang akan dibincangkan dalam laporan ini. Projek ini disasarkan kepada pihak berkuasa tempatan dan orang awam di Kuantan, Pahang untuk mendapatkan pengalaman yang lebih baik semasa menggunakan ruang letak kereta awam. Projek ini dibangunkan dengan menggunakan Visual Studio termasuk Xamarin.Forms dan Windows Form. Perekaan Interface telah dicipta bagi menyenangkan pengguna semasa menggunakan aplikasi dan dibuat berdasarkan Software Requirements Specification (SRS). Semua fungsi yang diperlukan telah divisualisasikan dalam Use Case dan Seqquence Diagram. Bagi tujuan pembangunan system, semua class dan data structure telah dibangunkan berdasarkan Software Design Document (SDD). 30 pengguna telah diminta untuk menjalankan User Acceptance Test (UAT) bagi aplikasi yang dicipta dan maklum balas telah diringkaskan dalam dokumen UAT..Dengan mewujudkan sistem ini, pengguna awam boleh membuat pembayaran untuk sesi letak kereta mereka dengan cara yang lebih mudah, dengan mengmbas kod QR yang dilampirkan.

ABSTRACT

The current public parking payment method has always been a great issue for years. Many problems including faulty machine, lack of coupon agent have troublesome the people who are using the parking space. Many experts have created some applications to overcome the same issues in different area. However, there are still some inadequate occurred in the current existing applications. QrPay Parking System is proposed to handle the parking payment issues occurred in Kuantan, Pahang with a better way. The main idea of QrPay Parking System is the user can locate the parking lot with their mobile device by scanning the QR code attached at the parking lots. The user can make their parking payment through the mobile application where the system will automatically calculate the amount for them based on the durations they spent on the parking session. This system will be developed by using the Mobile-D approach which is one of the general Agile methodologies. The development of the system will go through five different phase which we will discuss in this report. This project is targeted to the local authority and the public figures in Kuantan, Pahang to have a better experience on using the public parking spaces. This project is implemented by using Visual Studio including Xamarin.Forms and Windows Form. The interface design is easy for user to navigate and is created based on the Software Requirements Specification (SRS). All the functions available are visualized in Use Case and Sequence Diagram. For development purpose, all the classes and data structure are implemented based on Software Design Document (SDD). 30 users have been asked to perform user acceptance test (UAT) on the applications created and the feedback have been summarized in the UAT document. By creating this system, the public user can perform payment for their parking session in a more convenient way, which by scanning the attached QR Code.

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QR	Quick Response

CHAPTER 1

INTRODUCTION

1.1 Introduction

Nowadays, many tasks that was manually operated are being computerised. Previously, a complete task that consist of many procedures is consuming time and other resources. The major focus of the changes from manual ways to computerised ways is to provide convenience to the user on completing the tasks and give more satisfaction to them. Most of us, almost everyone is holding at least a smartphone with us. Despite on that, the smartphone still being use mostly on communication purpose only instead of many other functions that it can perform. In order to upgrade the quality of our daily life, the usage of smartphone should be optimized to its' full capability.

Currently in Malaysia, the payment on the public parking often become an issue. People were experiencing situations where they cannot find a working parking machine or lack of parking coupon when they parked their vehicle on the public parking space. These issues could make them failed to make payment for their parking. Thus, they had to take risks to be penalized by the local authorities. It is too sad to find out that the responsibility on what happened should not only taken by the public but other parties as well.

Thus, this project is being proposed in order to solve the several issues that mentioned. The QR code technology is added to the system in order to enhance users' experience while using it.

The QR code is basically a natural extension of the conventional barcode(Mark O'Neill, 2015). In many other developed countries, QR code technology has been widely used in different fields including advertising and payment services. QR code can store a huge amount of information in one design of code. As many of us have at least one mobile device with us, the QR code can be access in a simple way.

1.2 Problem Statement

Below are the following problems that occurred.

1.2.1 Faulty Machine

Some areas in our region still using a method where people insert money to the machine to get a parking ticket based on the amount inserted. However, there are a lot of machine that have worked for years and did not have regular maintenance on it(Natashya, 2017). This cause the machine became faulty. Some machine will even calculate a wrong charges from the payment people paid on it(Fa Abdul, 2016). Note that the distance between these machines are not near with each other and people cannot ensure that the next machine that they can find is working properly(Ismail, 2017). Without a doubt, this will waste their time and energy. Certainly, they probably would not be able to make their payment successfully.

1.2.2 Lack of Coupon Agent

Some areas are starting to use another mechanism which is prepay parking coupon. People only need to tear off the relevant tabs to indicate the date and start time of the parking. However, people always experience situation where there is no any coupon left and unable to find any coupon agent near their parking space immediately(Metro News, 2017). Thus, they will be unable to display the coupon on their vehicle's dashboard.

1.2.3 Environmentally Destructive

Both car park ticket from machine and the parking coupon are using paper as the media to display the payment evidence. Perhaps only 6 out of 71 tabs of the coupon is being used for each of it. Moreover, each coupon is only valid for 1 hour and the coupon is no longer can be use other than being thrown or recycle purpose.

1.2.4 Lack of Flexibility

Both car park ticket from machine and the parking coupon are using a time-limit standard where people had to rush back to their car to extend their parking period(Malaysian Digest, 2016). This is exhausting and tiring when people might be having busy business on that time.

1.3 Objectives

The aim of this project is to handle the problem stated in order to enhance the experience of the user while using the system with the following objectives:

i. To study the process of the existing car park payment system and propose suitable functions during the development of the project.

ii. To create a prototype of parking payment system based on QR code scanner.

iii. To test the system on functionality and users' acceptance level.

1.4 Scope

The project's scopes are listed as follows:

i. The system consists of mobile applications and windows application.

ii. The system is targeted to the public figures in Kuantan who using public parking spaces and the local authorities.

iii. The system is computerised to allow user to make parking payment through mobile platform and QR code scanner.

REFERENCES

Abrahamsson, P., Ihme, T., Kolehmainen, K., Kyllönen, P., & Salo, O. (2003). Mobile-D for Mobile Software: How to Use Agile Approaches for the Efficient Development of Mobile Applications Tutorial introduction. Retrieved from https://pdfs.semanticscholar.org/d94f/e965c5a397b0c84756824a7d40140b517ada.pdf

Abrahamsson[1], P., Hanhineva[1], A., Hulkko[1], H., Ihme[1], T., Jäälinoja[1], J., Korkala[2], M., … Salo[1], O. (2003). Mobile-D: An Agile Approach for Mobile Application Development. Retrieved from https://arxiv.org/ftp/arxiv/papers/1709/1709.06820.pdf

Adrian, L. (2017). Pay for parking via mobile app, Latest Singapore News - The New Paper. Retrieved May 3, 2018, from http://www.tnp.sg/news/singapore/pay-parking-mobile-app

Fa Abdul. (2016). Feeling cheated by DBKL's new parking rates | Free Malaysia Today. Retrieved May 3, 2018, from http://www.freemalaysiatoday.com/category/opinion/2016/08/28/feeling-cheated-by-dbkls-new-parking-rates/

Gonzalez-Perez, C. (2005). JOURNAL OF OBJECT TECHNOLOGY Templates and Resources in Software Development Methodologies. *Journal of Object Technology*, *4*(4), 173–190. Retrieved from http://www.jot.fm/issues/issue_2005_05/article5

Heong Tung, Y. (2017). Singapore govt is developing a parking coupon app; will be trialled at 84 carparks. Retrieved March 22, 2018, from https://sg.news.yahoo.com/singapore-govt-developing-parking-coupon-app-trialled-84-104031716.html

Ismail, S. (2017). Which of these parking peeves bug you the most? - Nation | The Star Online. Retrieved May 3, 2018, from https://www.thestar.com.my/news/nation/2017/11/15/which-of-these-parking-peeves-bug-you-the-most/

Latif Yasir. (2015). architecture of mobile software applications. Retrieved May 3, 2018, from https://www.slideshare.net/hassandar18/architecture-of-mobile-software-applications

Malaysian Digest. (2016). Why Is MBPJ Issuing Fines To Motorists When Parking Meters Are Faulty? Retrieved May 3, 2018, from http://malaysiandigest.com/features/636397-why-is-mbpj-issuing-fines-to-motorists-when-parking-meters-are-faulty.html

Mark O'Neill. (2015). What Is a QR Code and How Does It Work? - Small Business Trends. Retrieved May 2, 2018, from https://smallbiztrends.com/2015/05/what-is-a-qr-code.html

Melissa, C. (2017). You can no longer "siam" the summon auntie - new parking app by government agencies to roll out by Oct, Singapore News - AsiaOne. Retrieved May 3, 2018, from http://www.asiaone.com/singapore/you-can-no-longer-siam-summon-auntie-new-parking-app-government-agencies-roll-out-oct

Metro News. (2015). Mobile app offers easier method to pay for parking in Taiping - Metro News | The Star Online. Retrieved March 22, 2018, from https://www.thestar.com.my/metro/community/2015/12/07/mobile-app-offers-easier-method-to-pay-for-parking-in-taiping/

Metro News. (2017). Futile search for parking coupons - Metro News | The Star Online. Retrieved May 3, 2018, from https://www.thestar.com.my/metro/community/2017/09/05/futile-search-for-parking-coupons-teething-problems-for-new-scratchanddisplay-system-in-petaling-jay/

Metro News. (2018). Paying parking fee made easy - Metro News | The Star Online. Retrieved March 22, 2018, from https://www.thestar.com.my/metro/metro-news/2018/01/24/paying-parking-fee-made-easy/

Natashya, K. (2017). The sad reason why Petaling Jaya is removing parking machines and reintroducing scratch coupons | CILISOS - Current Issues Tambah Pedas! Retrieved May 3, 2018, from https://cilisos.my/mbpj-is-moving-back-to-parking-coupons-we-ask-them-why/

Pisuwala, U. (2017). All about App architecture for efficient mobile app development. Retrieved May 3, 2018, from https://www.peerbits.com/blog/all-about-app-architecture-for-efficient-mobile-app-development.html

Pisuwala Ubaid. (2017). Everything You Need to Know About Mobile App Architecture - DZone Mobile. Retrieved May 3, 2018, from https://dzone.com/articles/everything-you-need-to-know-about-mobile-app-archi

Spataru, A. C. (2010). Agile Development Methods for Mobile Applications. Retrieved from https://www.inf.ed.ac.uk/publications/thesis/online/IM100767.pdf

Spert, A. (2016). ParkBox - The conveniently street parking payment app. Retrieved May 3, 2018, from http://www.parkbox.my/

Supan*, D., Teković*, K., Škalec*, J., & Stapić, Z. (2013). Using Mobile-D methodology in development of mobile applications: Cha…. Retrieved April 3, 2018, from https://www.slideshare.net/ZlatkoStapi/using-mobile-d-methodology-in-development-of-mobile-applicationspptx

Venkataraman, G. (2017). 10 Facts About Parking.sg, The App That'll Make Parking Coupons History - Goody Feed. Retrieved May 3, 2018, from http://goodyfeed.com/10-facts-parking-sg-app-thatll-make-parking-coupons-history/